



D0 Calibration Databases

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Calibration Databases

- Two separate databases, one for Online and one for Offline
 - Dzero requires that the online DAQ system must be able to run without connections to the outside world.
- Offline Calibration database stores only a (good) subset of Online database.
- Online Calibration database stores all calibration runs.
 - Backup and delete operation is planned when it is full.



Calibration Databases

- Data are transferred periodically from Online to Offline
- Relational database ORACLE chosen
 - Don't know why ORACLE
 - 'cause everybody else in the lab is using it
 - Fermi specific applications developed, i.e. MISWEB
 - Could use mySQL. Cheap, but DBA tools and support are poor.



Online Calibration Database

- ORACLE 8.1.7
- Describes sub-detector hardware structure
- Online calibration process writes results to this database
 - means and sigmas from pedestal runs
 - means and sigmas from pulser runs
 - means and sigmas from gain runs
- Stores download parameters derived from calibration constants



Online Calibration Database

- Manpower
 - One DBA
 - One DB application expert (contractor)
 - One or two people from each sub-detector for DB table design and developing software for data collection
 - One developer for online calibration framework



Offline Calibration Database

- ORACLE 9i
- CORBA based Database server to limit the number of connections to DB for cost saving.
- Database server uses the common base code to SAM servers.
- Server code generated from the table definitions.
- Stores only calibration constants.



Offline Calibration Database

- Stores ALL good sets of calibration constants.
 - Initial estimates for SMT calibration data required a special data reduction mechanism.
 - As a result, the system is over-designed.
- Client code partially (header files of DB table classes) generated from the table definitions.

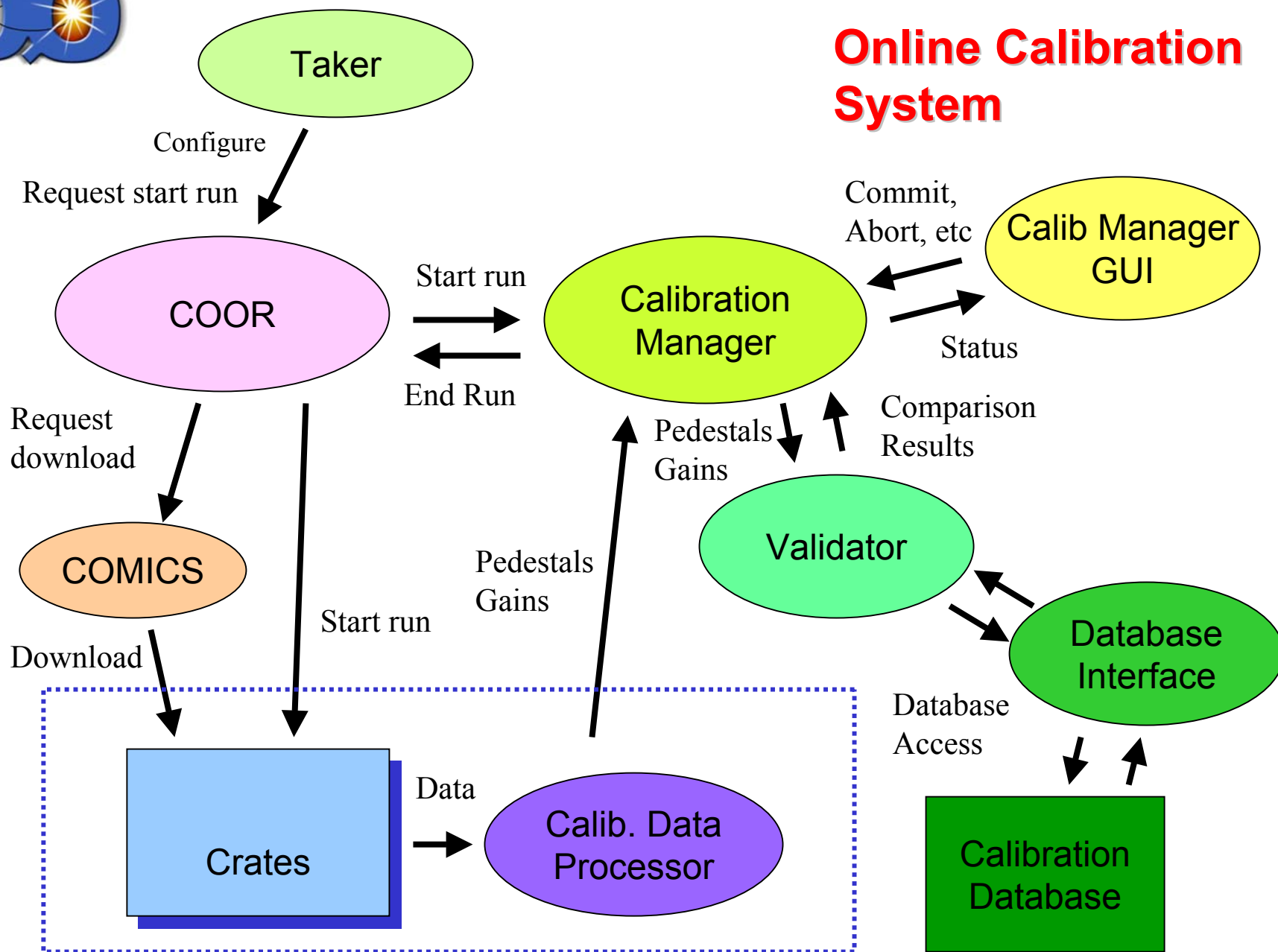


Online Calibration System

- Collect and analyze data, and insert constants into database
- Three different methods to acquire constants
 - FE processor, L3 filter, and offline analysis
- New constants are compared with the older values
(Validation)



Online Calibration System





Online Calibration System

- SMT
 - Approximately 800,000 channels in 12 crates
 - Data collected and analyzed in the FE processors and the results shipped to CalibManager
 - SVX thresholds are calculated from the measured pedestals and downloaded to FE
- CFT/CPS/FPS
 - Approximately 125,000 channels
 - Electronics and offline calibration methods
 - Possibly instantaneous luminosity dependent



Online Calibration System

- Calorimeter
 - Approximately 50,000 channels
 - Data analysis performed as a L3 filter and the results shipped to CalibManager via C/R
- Muon
 - Three systems
 - PDT (7,000 channels, T0, pad gain, Drift t-to-d)
 - MDT (50,000 channels, T0, Drift t-to-d)
 - MSC (6,000 channels, T0, pedestal, gain)
 - Offline data analysis



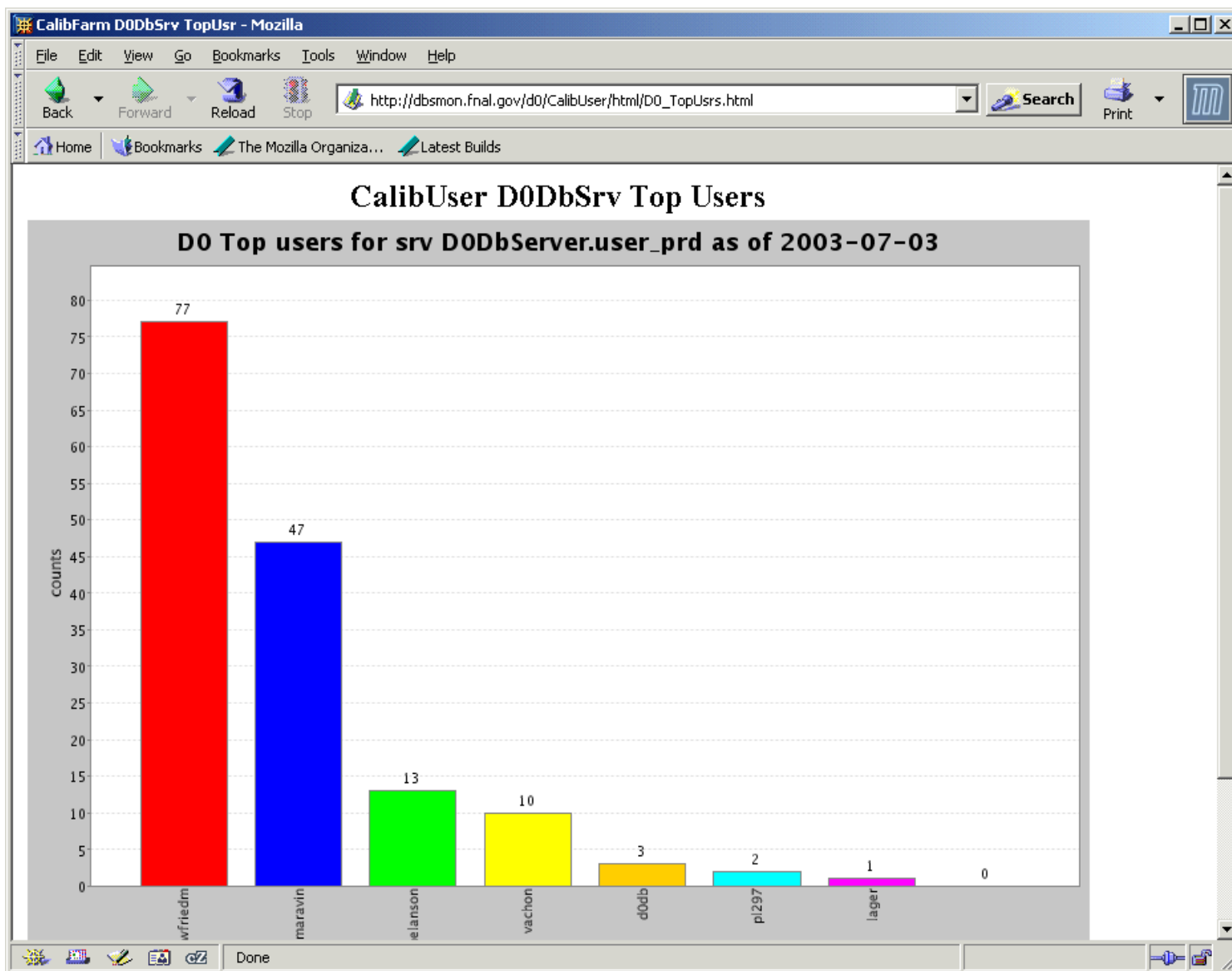
Offline Calibration System

- CORBA based client-server system
- Server sends data in d0om (d0 persistency mechanism) format so that the backend can be changed to a file instead of a DB.
 - Initial design for deployment in remote centers.
- Memory cache for a faster delivery of data.
- File cache for remote deployment.



Offline Calibration System

- Statistics reporting system for monitoring.
- Server is written in Python.
 - Very slow and bloated.
 - Initial plan included to rewrite the server in c++.
- Implemented c++ cache server for short term fix.
- D0 farm runs 600 processes and requests a calibration set every 100 sec.
 - Current system should be able to handle this.



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Offline Calibration Database

- Manpower
 - Two DBAs
 - Two DB application experts (one contractor, and one in-house) for transferring data from online to offline and monitoring
 - One DB server developer
 - One c++ developer for client code framework
 - One or two developers for each subsystem to design DB tables and write client code.



Summary

- Online Calibration Database
 - In production since the beginning of Run II.
- Offline Calibration Database
 - In production for one year.
 - The latest delivery system to reco clients in production since Monday.
 - The python based delivery system may need upgrades.